

INFORMATION REPORT INFORMATION REPORT

CENTRAL INTELLIGENCE AGENCY

This material contains information affecting the National Defense of the United States within the meaning of the Espionage Laws, Title 18, U.S.C. Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

S E C R E T

COUNTRY	Czechoslovakia	REPORT	25X1
SUBJECT	Synthesia, National Enterprise, Semtin	DATE DISTR.	25X1
		5 April 1955	
		NO. OF PAGES	25X1
		11	
DATE OF INFO.		REQUIREMENT NO.	25X1
		RD	
PLACE ACQUIRED		REFERENCES	
DATE ACQUIRED		This is UNEVALUATED Information	

1. The plant of Synthesia, National Enterprise, in Semtin, near Pardubice, consists of: 25X1
 - a. The actual Synthesia plant..
 - b. The Explosia plant, which is a part of Synthesia, and is covered by the latter's firm name.
 - c. The UMA plant (Umely Material - Artificial Materials), until 1951 known as Sector 4. Since 1951 it has been independent, although the building belongs to Synthesia.
 - d. General Management of Synthesia, transferred to Semtin from Prague in 1950.
 - e. The official Research and Testing Institute, Semtin, telephone 2555 and 2556.¹ This Institute works for Synthesia and Explosia.
 - f. UPH Research Institute (Ustav Plastickyh Hmot - Institute for Plastic Materials) is independent and cooperates with the Technical College of Chemical Engineering in Prague. In summer 1950 this Institute was transferred from Semtin to Pardubice.
2. The Synthesia plant is located northwest of Pardubice (N 50-02, E 15-47) on the north side of the Pardubice-Trnova-Doubravice-Lazne Bohdanec road. It is bounded on the west by the Pardubice-Bohdanec asphalt road, turning northwest where the Rybitvi road branches off it; on the south by the asphalt road from Doubravice up to where the road forks off to Rybitvi; on the north there is no fixed boundary, because this part of the plant is located in a forest of birch trees in the eastern part and of pine trees in the west; and on the southeast by a field lane from the asphalt road to Doubravice.
3. The factory railroad siding diverts from the main railroad track Pardubice-Hradec Kralove at the Rybitvi station. Power is supplied by the East Bohemian Power Plant. In 1953 a new plant was under construction in the works themselves. 25X1

S-E-C-R-E-T

STATE	X	ARMY	X	NAVY	X	AIR	X	FBI	AEC	ORR Ev	x	OST Ev	x
-------	---	------	---	------	---	-----	---	-----	-----	--------	---	--------	---

(Note: Washington distribution indicated by "X"; Field distribution by "#")

INFORMATION REPORT INFORMATION REPORT

S-E-C-R-E-T

- 2 -

25X1

4. Description of the Synthesia Plant (see Annex A): The south side of the plant, along the road, is about 1,500 m. long, but the actual length in the center of the plant (west to east) is about 2,000 m. The width (north to south) cannot be given accurately, because the north boundary is very irregular. It may be between 1,000 and 1,500 m.
- (1) Wire fence surrounding the plant, supported by concrete and iron pillars.
 - (2) On the south side of the road, to the southeast of the plant, is the so-called Semtinska Kolonie (Semtin Colony), an older development of brick and wooden houses for workers. Unmarried workers are usually housed in the wooden houses.
 - (3) On the south side of the road which diverts from the main road to Rybitvi, and about 500 m. south of the crossroad, are buildings of the Rybitvi East Bohemian Chemical Works (formerly the Association for Chemical and Foundry Industry, Plant Rybitvi), which manufactured dyes and drugs.
 - (4) About 600 m. northwest of the East Bohemian Chemical Works is the new boiler house of Synthesia.
 - (5) The main entrance to Synthesia Semtin is in the southeast, about 200-300 m. west of the eastern edge of the plant. The entrance is some 100 m. north of the road.
 - (6) In the southeast corner are three buildings separated from the actual plant by a fence. West of the buildings, towards the main entrance, is the vehicle park. Offices of the Synthesia Management are in a three-story building near the road, 50 x 40 m.
 - (7) Technical workers, mainly engineers, are accommodated in two buildings situated on the north side of the Management building. One of the buildings is three-storied, 35 x 40 m., the other 50 x 35 m.
 - (8) Building of the Technical Management, north of the main gate (sic). It is a two- or three-story building, 50 x 30 m.
 - (9) North of the above building is a one-story brick building, 30 x 20 m., with a guardroom in its south end. The north part contains the Personnel Department.
 - (10) On the other side of the lane entering the plant is the Synthesia Post Office building, one-story, brick, 30 x 20 m.
 - (11) North of the Personnel Department is a one-story brick building, 20 x 20 m., containing the Chemical School for Adults (Pokracovaci Skola - vocational chemical training).
 - (12) Garages, 30 x 20 m.
 - (13) North of the garages is a two-story building, 50 x 30 m. On the ground floor in the western part is the operating room and in the eastern part is the dining room. On the 2nd floor above the operating room are the dental office, Propaganda and Cultural Department, and the Secretariat of the Youth League.
 - (14) The Research Institute, a three-story building, 30 x 60 m. In it are various laboratories. The physical laboratories are well equipped with instruments and apparatus of Czechoslovak and foreign makes (mainly German). Laboratories of the Technical College of Chemical Engineering of Pardubice are also in the premises formerly occupied by the UPH Institute. (The terms at this college begin in October. The college itself is in the building of the former Chemical Industrial School, in the vicinity of the Grand Hotel in Pardubice.)
 - (15) Maintenance workshops, on the north side of the cobblestone road running through the grounds to the explosives department. One-story building, 30 x 15 m.

S-E-C-R-E-T UNCLASSIFIED

25X1

S-E-C-R-E-T

- 3 -

25X1

- (16) Fire-brigade store (wooden, one story, 30 x 15 m.) located on the east side of a lane which diverts southwest of the above road.
- (17) The boiler house is located on the west side of the road, south of the fire-brigade store. It is a two-storied building with a 35 m. high chimney of steel-reinforced concrete construction, 40 x 40 m.
- (18) South of the boiler house, on the east side of the road, is the brick one-story building, 20 x 15 m., of the electrical shop.
- (19) South of the electrical shop is the one-story brick building, 35 x 20 m., of the materials store.
- (20) On the other side of the road is another store in a one-story brick building, 35 x 20 m.
- (21) The so-called Department B, which actually is the Explosia Plant, consists of a number of one-story buildings scattered in the pine and birch woods. Along the southwest border of Explosia runs the siding, which separates Department B from the UMA Plant.
- (22) Department B is surrounded by a wire fence and persons entering must produce special permits. This Department is being expanded, but since it is classified top secret, employees from UMA and Synthesia were unable to find out any details about it.
- (23) Entrance to Department B from the cobblestone road and guardroom.
- (24) The actual Synthesia Plant consists of a number of one-story buildings containing various production departments, e.g., sulphuric-acid department. The two-story buildings are occupied only by offices. This part is bordered on the east by a belt of offices and garages. Along the northwest side runs a connecting road, to Department B. On the southwest is another connecting road, diverting from the main road and leading to the UMA Plant. The south border is formed by the asphalt road Pardubice-Bohdanec. To the west is the southeast edge of the UMA Plant. The actual Synthesia Plant consists of some 30 - 40 buildings. In 1950 new pyrite furnaces were built and put into operation.

Description of the UMA Plant (see Annex A)

- 5. The UMA Plant is bounded on the south by part of the asphalt road Pardubice-Bohdanec (the section where a road diverts towards Rybitvi and where the siding crosses the road); on the northwest by the asphalt road to Bohdanec, bending to the northwest; on the northeast by a siding from which several rails divert to the east; and on the north by the edge of a woods.
- (25) In the southeast corner is a one-story building, 60 x 25 m., where experimental films are made. Also experiments with film emulsions are carried out here.
- (26) Department for pressing artificial materials.
- (27) One-story brick building, 20 x 15 m., of the UMA maintenance shop. In another one-story building, 60 x 30 m., are departments for plastic materials, plastic research laboratories, and maintenance shops.
- (28) One-story building, 60 x 30 m., with two impregnation towers. Contains the new Spraying-Material Department, Impregnation Department, and celluloid presses (presses for "crescents", so-called because of the form of the product).
- (29) Stores for chemicals, parallel with building 28. Wooden, 60 x 30 m.
- (30) North of the stores, a one-story brick building, 50 x 30 m., housing the Production Department of Organic Glass (UMAPLEX - Plexiglass).

S-E-C-R-E-T

25X1

S-E-C-R-E-T

- 4 -

- (31) Two-story building, 50 x 30 m., the so-called UMACOL-Resin Department. On the ground floor is a service laboratory. 25X1
- (32) Next to the Resin Department is a tank containing various materials, e.g., phenol, formaldehyde, with pipes to the building.
- (33) Two-story building, 50 x 30 m. in size, Powder Department for the manufacture of powder used in production of 'Bakelite'.
- (34) One-story building, 50 x 30 m.; since 1950 it contains the Cast Resin Department.
- (35) One-story brick building, 50 x 30 m., technical offices.
- (36) Last building in the line, one story, brick, 50 x 30 m. Tools and materials stores.
- (37) Store of finished products and shipping department are in a two-story brick building, 60 x 30 m., northwest of the above line of buildings.
- (38) New Film Department, built in 1950, situated north of the shipping department. Two-story, brick, 50 x 40 m. The Film Department is equipped with new machinery from Switzerland, made in 1950. In the beginning of 1952 a fire broke out here, but the machinery suffered no serious damage.
- (39) Dining room, baths, and cloak rooms of UMA, situated in a one-story brick building, 50 x 20 m., north of the Film Department.
- (40) Celluloid Department in a one-story brick building, 45 x 30 m., in the vicinity of the siding, south of the dining room.
- (41) In the northwest corner of the woods which extends towards Bohdanec, there are about 20 two-story houses which serve as living quarters for engineers and other personnel of Synthesia. This development is called Horka.

Machinery and Equipment

6. Most of the machines in the Synthesia plant are of German origin and were delivered in 1940-45. They are well maintained and in good working order. Three pyrite furnaces are of 1949 production. A great number of machines in UMA were taken over from the plant at Vysocany, which was moved here during the war. The original machines belonging to UMA are of Czech production and machines, instruments, and especially presses, were produced by private firms. In 1950 a new line of production was started - cast resin production - for which new machinery, probably of Czech origin, was set up. The UMA machinery is being continuously supplemented by new machines and the building of new impregnation towers is also planned. The original impregnation towers were made in England. Under the war-reparation scheme one large press was delivered from Germany but, owing to the lack of experts, it could not be assembled and put into operation. The physical laboratory in UMA is almost exclusively equipped with German machines and instruments: two or three machines for tension and bending tests, two viscometers, and a number of refractometers and microscopes. Two or three technical workers are employed in this laboratory. Two synthetic laboratories are still using Jena glass from old stock. Research is based mainly on German patents and English, American, and German scientific literature (books and periodicals). Six or seven experts were employed in the synthetic laboratories. Mainly German material is used. The pressing department contains five or six hydraulic presses (pressing plates 1-1/2 x 1 meter in size) and several small presses, so-called 'robots', used for experimental work.

Personnel

7. About 2,500 to 3,000 employees are employed in the three plants. About 40% are women, working in the administrative departments, stores, celluloid

S-E-C-R-E-T

25X1

25X1

S-E-C-R-E-T

- 5 -

25X1

department, plexiglass department, and operating celluloid presses (in the UMA Plant only). Department B suffers from a lack of technical experts, e.g., graduates in chemical engineering, and, as a result, young engineers, just graduated but with no practical experience at all, are soon appointed head engineers in charge of production. There is a great deal of ill feeling between the employees because new-comers get better positions. About 20% of all the employees are technical experts, mainly chemical engineers. There are also some construction engineers. The skilled workmen are mainly electricians and fitters. Approximately 70% of the technical personnel are anti-Communist. Skilled workers are also anti-Communist in the large majority. There is a tendency in the plant to favor young "progressive" employees, who sometimes lack both experience and knowledge. Experts who are not "progressives" are not persecuted in any way, but have little hope of promotion, although the factory depends largely on their work and experience. Although Synthesia was praised as one of the "Stakhanovite Plants", working morale was not particularly good.

8. Working hours: in the research laboratories, one shift; in the production laboratories, two shifts; in production departments, two or three shifts.
9. Besides the Sementin Colony (see paragraph 4) and the new development called Horka (paragraph 4), in 1950-51 new blocks of flats for employees were built at Pardubice. Many employees travel daily by bus from Pardubice to Bohdanec. A trolley-bus line started here in 1951. Canteen food is of average quality. Laboratory workers receive one-half liter of milk daily free of charge. Every employee is entitled to one working suit or coat per year, free of charge.
10. UMA Plant:

25X1

S-E-C-R-E-T
NOFORN/CONTINUED CONTROL

S-E-C-R-E-T

6 -

25X1

11. Explosia:

Head of one of the departments: Eng. Karel Holub

25X1

25X1

12. Research Institute:

Eng. Oldrich Hazuka, formerly head of the nitroglycerin department

25X1

25X1

13. Communist Party:

As far as Party organization is concerned, Synthesia forms an independent district. Chairman of this District CP organization is Richard Bok

25X1

25X1

Production

14. Synthesia:

- (1) Synthetic ammonia - NH_3 - used in cellulose nitration and in the production of nitroglycerin. The ammonia production probably covers only the requirements of Synthesia.
- (2) Nitric acid - HNO_3 - nitric acid plus sulphuric acid (H_2SO_4) yield the so-called "nitric mixture" used in the production of nitric compounds and explosives. The nitric acid produced at the plant is probably not destined for distribution and covers only the requirements of Synthesia.

15. UMA Plant:

- (1) Synthetic phenol-formaldehyde resin, trade name UMAKOL, used in the aircraft industry for gluing wooden propellers and for floor parqueting. At the UMA Plant UMAKOL is used for paper and textile hardening. Following this treatment they are pressed and the finished products receive the trade names: UMAKART (paper) and UMATEX (textile).

Chemicals used in the process:

900 g. formaldehyde 30% HCOH
 600 g. phenol $\text{C}_6\text{H}_5\text{OH}$
 15 g. sodium hydroxide NaOH in 15 g. H_2O
 150 g. acetone - $\text{CH}_3\text{CO CH}_3$
 75 g. paraformaldehyde $(\text{HCOH})_n$

Process: Condensation at about 96°C , for 15 to 20 minutes, followed by cooling down to 35°C , distilling at 45°C under reduced pressure (96 mm. Hg). Water is distilled (42% of the raw material employed). Further condensation in $\text{CH}_3\text{CO CH}_3$ - $(\text{HCOH})_n$ solution at 80 to 85°C . Viscosity: 25 - 28 centipoise.

Paratoluensulfonic acid is used as a hardening agent. The above process is rather out of date. Resin is not condensed under pressure. Very often workers carried out the condensation under higher temperatures than prescribed, in order to achieve a higher output and earn more money, with the result that the products hardened right in the condensation boilers and had to be cut out. This caused breakdowns of several days. The products are transported in iron barrels (quantity unknown to informant). Today dissolving is done exclusively by acetone, because the previous alcohol method was causing skin diseases (inflammation caused by ester of the paratoluensulfonic acid).

S-E-C-R-E-T

25X1

S-E-C-R-E-T

- 7 -

25X1

25X1

- (2) **UMAKART** - hardened paper: sheets 1-1/2 x 1 meter in size, 2-10 mm. thick, and pipes of various diameter, used as insulating material for electrical purposes, are being produced mainly. The thinner sheets are used for car bodies, in furniture manufacturing, for cogged wheels and couplings. Cogged wheels made of **UMAKART** or **UMATEX** do not wear out as easily as the metal ones and require a minimum of lubrication.

25X1

The **UMA Plant**, **Semtin**, produces the same amount of **UMATEX** and **UMAKART** as a branch plant at **Mesice**, near **Prague**, which is engaged exclusively in this production. Cogged wheels and couplings are finished on lathes at the **UMA Semtin Plant**.

25X1

25X1

Production process: **UMAKART** and **UMATEX**: sheets of paper or textile materials are run through impregnation towers to be saturated with **UMAKOL-B** (synthetic resin). The product is then partly hardened and cut to the required sizes. Finally it is hardened (in process) under pressure and at certain temperature.

- (3) **UMATEX** - same use as **UMAKART**.
- (4) **UMAPLEX** - artificial glass (Plexiglass). Production is mainly for military purposes. **UMAPLEX** is produced in sheets, 2 x 2 meters and 2 - 10 mm. thick. Experiments are being carried out for the improvement of the optical properties of **UMAPLEX** so that it can be used for lenses. **UMAPLEX** production is based on German methods (Plexiglass) and Italian patents purchased in 1950. It is largely used in the aircraft industry. One engineer, one foreman and about 10 women workers are engaged in the Plexiglass production.
- (5) **UMALIT** - Bakelite: **UMALIT** is produced in the Powder Department and it has a very wide use, mainly for electrical purposes. Its basic component is phenol - formaldehyde resin. Cresol can also be used instead of phenol and the material is pressed. Sawdust is used for hardening. The final product has the shape of boxes, coils, etc.
- (6) **Cast Resin** - building insulating material. Cast resin is used in the building industry and in furniture and decorative articles manufacture. It is produced at **Synthesia, Semtin**, and at the **Stalin Works, Most**. It is produced in the shape of hollow ashlars or rods which are then finished according to special requirements. Its insulating properties (resistance to moisture and cold) are excellent.
- (7) **CELLULOID** - celluloid is made of a nitrocelluloid-camphor mixture. Celluloid is used in the film industry and also for military purposes. The so-called "crescents" (rohlicky), containers filled with an explosive charge for mines, are pressed of this material (see Annex B). The celluloid container for mine charges is horse-shoe shaped, made of transparent celluloid 0.5 mm. thick, all in one piece. The horse-shoe is about 80 mm. long, widening slightly in the center to 20 mm. Its width at the ends is 10 mm. and the opening for the charge is on the top, 7 mm. x 3 mm. in size. Every product has to undergo a test in the physical laboratory and occasionally these tests are supervised by military personnel. The container has to be in perfect condition, without the slightest defect. The daily output amounts to several hundreds and about 15 women are engaged in this production at the pressing plant.
- (8) **CELON** - high-molecular acetylcellulose, soluble in acetone and can be used as substitute for celluloid. It is not inflammable and nowadays is used mainly in the film industry. In connection with the **CELON**, production experiments with various film emulsions were also carried out.
- (9) **Spraying Materials** - This production line was started in 1950 and the product was found more suitable than Bakelite, which is too brittle. Production is based on the so-called method of pearl-polymerisation.

S-E-C-R-E-T

25X1

S-E-C-R-E-T

- 8 -

The basic component is the monomeric derivation of methacrylic acid 25X1 (acrylic acid = $\text{CH}_2=\text{CH}.\text{COOH}$). Benzoylperoxide and other substances are used as catalytic agents so that ball-shaped products, so-called "little pearls" can be obtained. The spraying materials dye very well; the commonly used dyes are "Engeblau" (blue) and "Sudanrot" (red). These materials are made according to German methods (Scheiber: Kuenstliche Harze). Experiments with them are also carried out at the Institute for Plastics. They are however not suitable for articles exposed to temperature above 70°C , which causes softening and warping.

- (10) CLYPTAL - varnish. CLYPTAL is a plastic with hardening properties, produced in the UMA laboratories. In 1950 the Tesla Plant sent over to UMA a sample of a German varnish used for electrical purposes and a new type of varnish was produced. Production process: condensation of glycerin $\text{C}_3\text{H}_5(\text{OH})_3$ + phthalic anhydride $\text{C}_6\text{H}_4\begin{matrix} \text{CO} \\ \diagup \quad \diagdown \\ \text{O} \end{matrix}$ plus UMAKOL B.

CLYPTAL is employed in production of artificial paints and varnishes.

16. Explosia Plant:

- (1) Gunpowder
- (2) Guncotton
- (3) Trinitrotoluene - tritol ($\text{C}_6\text{H}_2(\text{CH}_3)(\text{NO}_2)_3$)
- (4) Nitroglycerin $\text{C}_3\text{H}_5(\text{ONO}_2)_3$
- (5) Dynamite

17. According to plant periodicals, production results attained in some departments were as much as 150 - 200% of the Plan. According to some engineers, however, results were only average. The main drawback is the lack of skilled workers. In some departments the workers wanted to increase their output to earn higher pay, regardless of the quality of the products. The highest percentage of rejects was in the production of UMAPLEX and of the synthetic resins.

18. Finished products were shipped from the plant by rail. Those destined for military purposes were probably taken over directly by Army personnel.

19. Explosions occurred in 1951 and 1952, although the safety arrangements are quite efficient. There is an automatic device which, in case of danger, can prevent explosions or at least reduce their effect by moving the material to underground reservoirs. Personal safety of workers is also closely protected. They must wear special clothes, without any metal, footwear, etc. Matches and cigarettes must be left in the guardroom. Most of the workshops are underground. Roofs are made of pasteboard.

20. Department B and, in fact, the whole of Synthesia are under military supervision. Synthesia and Explosia are controlled by Army officers. In the UMA Plant the controls are irregular and an NCO occasionally controls the charge containers of mines and supervises experiments. Products of the UMA Plant could be put to good civilian use, but the largest part of the output is destined for the Army.

21. Department B (Explosia) receives most of its materials from Synthesia. All the material is brought in by rail. Synthesia does not suffer from lack of materials. The UMA plant is using camphor from old German stocks established during World War II. Acetone is probably obtained from the Stalin Works in Most, as well as phenol and cresol. These materials are available in sufficient quantities. Shortage of some chemicals, e.g., oleic acid ($\text{C}_{17}\text{H}_{33}\text{COOH}$), is apparent mainly in the Research Institute. Experimental nylon production was being considered, but could not materialize owing to the lack of oleic acid. German chemicals, type Merck, were used in chemical analysis, but the stocks were running low. Chemicals of domestic production are of inferior quality and will probably cause difficulties.

22. Material requirements of the plant had to be calculated a year ahead. Since, however, it is difficult to know the exact amount of materials required in future production, this usually results in shortage of raw materials.

S-E-C-R-E-T

25X1

S-E-C-R-E-T

- 9 -

25X1

Especially the UMA Plant suffered by this, owing to the lack of experience in the new production departments. The same difficulties used to arise at the Research Institute, which resulted in slackening up of processes.

Research and Testing Institute, Semtin:

23. This Institute is concerned with the study of problems which may arise in the various departments of the plant. It is divided into the following branches according to specific tasks:

- a. Inorganic Chemistry - sulphuric and nitric acids
- b. Organic Chemistry - nitrocellulose, etc.
- c. Plastics Research, working for the UMA Plant and also studying new lines of production.
- d. Physics & Chemistry Department, working for the whole plant.

All new products have to undergo tests at this Institute. The Institute was to operate according to yearly plans, but this proved impractical. The physical laboratories are well equipped. A polarograph is also available there. The synthetic laboratories have poor equipment and lack instruments and apparatus.

24. Branch Factories of Synthesia, Semtin:

- a. Synthesia Kolin, formerly Fanto Works, refinery. Raw materials were tested at Kolin prior to shipment to Semtin.
- b. Synthesia-Satalice, near Prague, engaged mainly in production of synthetic material.
- c. Synthesia Mesice, near Prague, producing UMAKART and UMATEX. It is a small plant, well equipped, with 50 employees. It has horizontal impregnation towers of its own make. Production is well organized. The condensation of resin is done under pressure. Since 1951 the plant has its own physical and synthetic laboratories and the products are generally of better quality than those of Semtin.
- d. Pressing Plant Synthesia, at Havlickuv Brod, established in 1950.

Comment: The 1951 - 1952 telephone directory for Pardubice lists: Synthesia, chemické zavody, nar. podn., zavody Semtin - 2555, 2556, 2557, 2558. In the 1953 - 1954 edition of the telephone directory the numbers given for this listing have been changed to: 2558, 3051, 3052, 3053.

25X1

25X1

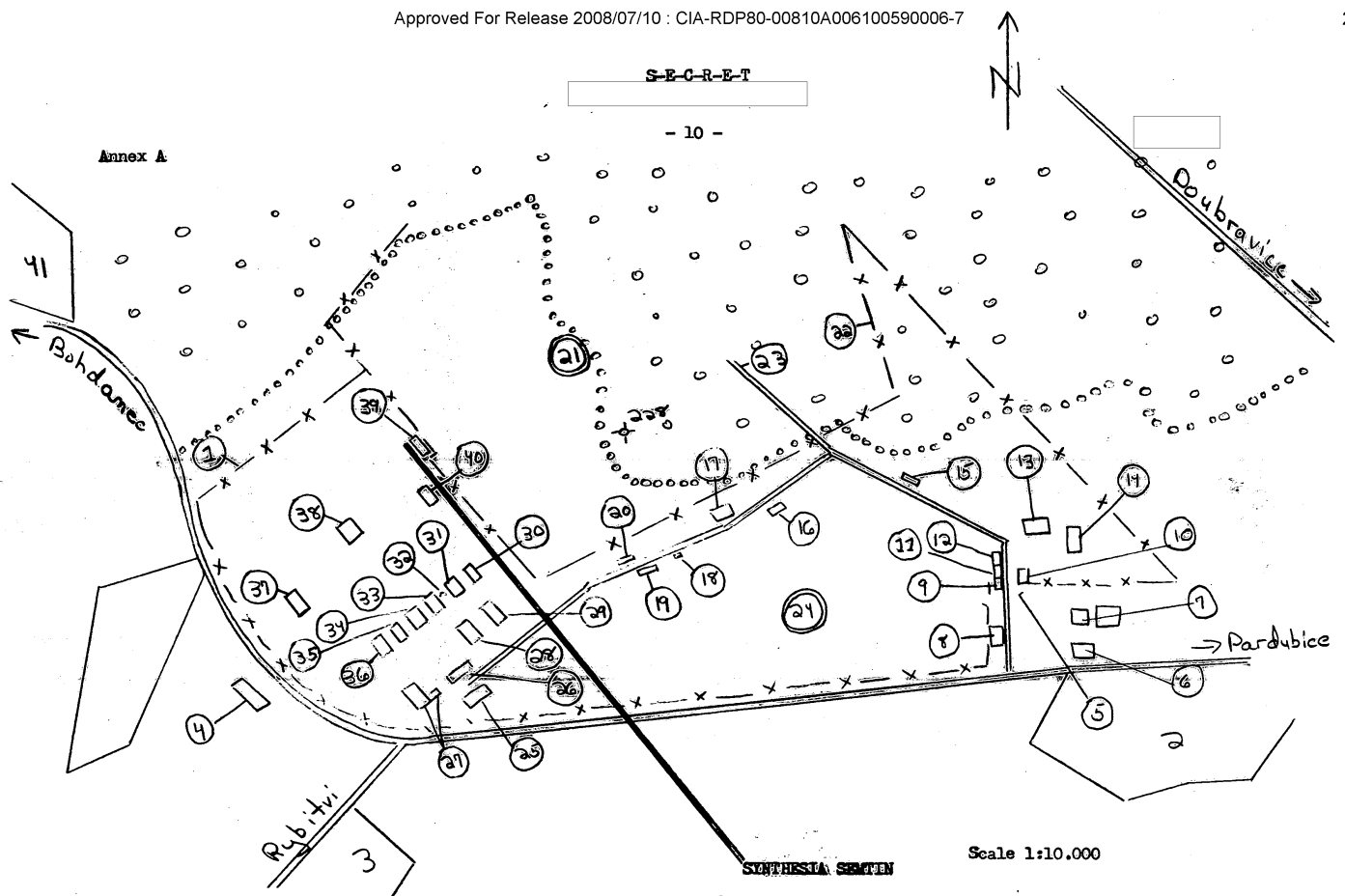
S-E-C-R-E-T

25X1

SECRET

- 10 -

Annex A



Scale 1:10,000

SECRET

~~SECRET~~

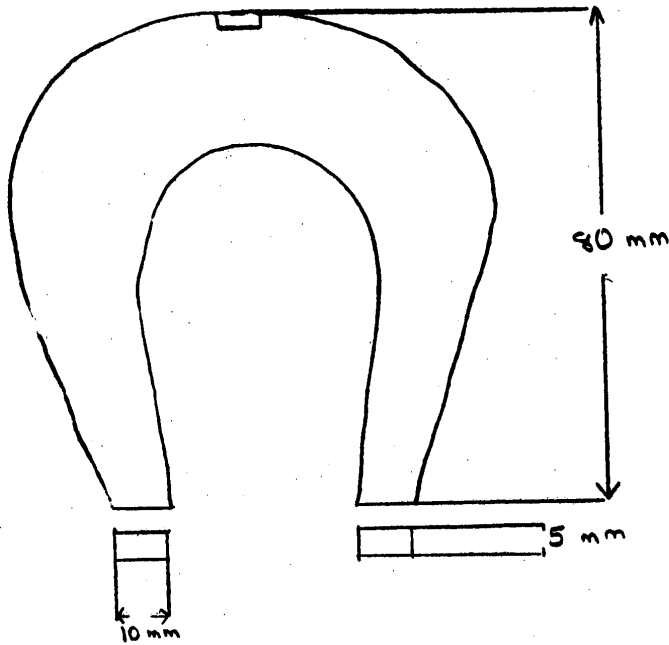
- 11 -

25X1

Annex B

Plastic Container for Mines

Scale 1:1



~~SECRET~~

25X1